NON-PUBLIC?: N
ACCESSION #: 8911300071
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Indian Point, Unit 3 PAGE: 1 OF 8

DOCKET NUMBER: 05000286

TITLE: Manual Reactor Trip Initiated When Twelve Control Rods Fully Inserted
EVENT DATE: 10/19/89 LER #: 89-015-00 REPORT DATE: 11/21/89

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Edward Diamond, Senior Plant Engineer TELEPHONE: (914) 736-8045

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: AA COMPONENT: FAN MANUFACTURER: W120
X SF V C060
X EA TTC W120
X AB V R344
REPORTABLE NPRDS: N
N
N
Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On October 19, 1989, with the reactor at 100 percent power, control room operators initiated a manual reactor trip when they observed 12 control rods fully insert into the reactor core. Instrumentation and controls technicians were performing surveillance test 3PT-M62, "480 Volt Undervoltage and Degraded Grid" at the time of the event. All systems functioned properly following the trip with these exceptions: the computer generated "sequence of events" record was lost; the Station Auxiliary Transformer tap changer responded sluggishly; operators encountered difficulty in restarting control rod drive mechanism cooling

fan #31; the condensate polisher facility bypass valve did not open; a leak developed on a pressurizer safety valve loop drain valve. While the plant staff was unable to determine the exact root cause of the event, the initiating occurrence was a "Non-SI Blackout" actuation on 480 volt bus 5A. It has been concluded that this resulted from a personnel error sustained during the performance of surveillance test 3PT-M62. Following a safety review by the Plant Operations Review Committee and approximately 100 hours of planned corrective maintenance, plant operators brought the reactor critical on October 23, 1989, synchronized the generator to the bus on October 24, 1989, and reached full power on October 25, 1989.

END OF ABSTRACT

DESCRIPTION OF THE EVENT

At 1622 hours on October 19, 1989, with the plant at 100 percent power, control room operators initiated a manual reactor trip when they observed 12 control rods fully insert into the reactor core. Instrumentation and controls technicians were performing surveillance test 3PT-M62, "480 Volt Undervoltage and Degraded Grid" at the time of the event. Low-low steam generator water level following the trip initiated an auto-start of the three auxiliary feedwater pumps. All plant systems functioned properly following the trip with the exception of the following:

Station Auxiliary Transformer Tap Changer Sluggish Response

The Station Auxiliary Transformer tap changer (EA) (TTC) (Westinghouse) (W12O) responded sluggishly to decreased 6900 volt bus voltage on the bus transfer from the Unit Auxiliary Transformer to the Station Auxiliary Transformer following the plant trip. As a result, voltage was low on the three 480 volt buses powered from offsite. Control room operators resolved this problem by taking manual control of the Station Auxiliary Transformer tap changer.

Loss of Sequence of Events Record

The loss of 480 volt bus 5A as the initiating event resulted in the loss of the computer generated sequence of events record.

Leak on Pressurizer Safety Valve Loop Drain Valve

Following the reactor trip, a 0.20 gpm packing leak developed on a pressurizer safety valve loop drain valve (AB)(V) (Rockwell

International) (R344).

Failure of 31 Control Rod Drive Mechanism Cooling Fan Line Fuses

At 1656, the operators encountered difficulty in restarting Westinghouse (W12O) Control Rod Drive Mechanism (CRDM) Cooling Fan 31 (AA) (FAN) (Model L-1036) after the loss of bus 5A. The fan blew its associated line fuses during restart. No such difficulty was encountered restarting 32, 33 and 34 CRDM Cooling Fans. A containment entry was made and the line fuses for 31 CRDM Cooling Fan replaced. 31 CRDM Cooling Fan was successfully restarted at 2053.

Condensate Polisher Bypass Valve Fails To Open

The Cameron Iron Works, Inc. (C060) Condensate Polisher Facility (CPF) bypass valve (SF) (V) (Model 505291 21 01 08) did not open on the unit trip as it should have.

INVESTIGATION OF THE EVENT

At 1500 on October 19, 1989 two Instrumentation and Controls (I&C) technicians started surveillance test 3PT-M62, "480 Volt Undervoltage and Degraded Grid." At 1622 they were performing step 3.7.9 of the procedure, which trips the 27-1 5A relay, an undervoltage monitor on 480 volt bus 5A. A Non-SI Blackout actuation did occur resulting in stripping of all loads from bus 5A, starting and tying-in of 33 EDG, and starting of Non-SI Blackout loads on bus 5A.

Among the equipment stripped from bus 5A was Motor Control Center (MCC) 39 (ED) (SWGR) (Westinghouse) (W120). At the time, MCC 39 was providing bias voltage to Rod Control Power Cabinet 1AC (AA) (CAB) (Westinghouse) (W120) . The normal power supply card deriving bias voltage from the Rod Drive Motor-Generator Set output had failed on August 23, 1989 and was not replaceable on line. When Power Cabinet 1AC lost its bias volta
e,
the twelve control rods associated with that cabinet, Shutdown Bank A Group 1, Control Bank A Group 1, and Control Bank C Group 1, dropped. The operators in the control room observed the drop of

the twelve control rods and promptly initiated a manual reactor trip.

Subsequent testing of individual components and repeated functional tests failed to duplicate the undervoltage relay actuation. Interviews of the I&C technicians performing the surveillance test failed to yield any human performance problems. Because of separate and independent verification of the proper operability of the hardware, the plant staff has concluded that a personnel error occurred during the performance of surveillance test 3PT-M62, "480 Volt Undervoltage and Degraded Grid." The following is a discussion of events secondary to the trip, but relevant to the event as a whole:

Station Auxiliary Transfer Tap Changer Sluggish Response

The cause of the Station Auxiliary Transformer tap changer sluggish response is not known. Manual operation of the tap changer restored nominal bus voltage.

Loss of Sequence of Events Record

An uninterruptible power supply energizes the plant computer. MCC-39, however, provides power to the sequence of events digital-inputs (breaker and relay contacts). The loss of bus 5A as the initiating event resulted in the loss of the sequence of events printout.

Leak on Pressurizer Safety Valve Loop Drain Valve

A 0.20 gpm packing leak developed on valve RCS-526 following the reactor trip. Valve RCS-526 is the common pressurizer safety valve loop seal drain valve.

Failure of 31 Control Rod Drive Mechanism Cooling Fan Line Fuses

Upon attempting to restart the CRDM fans after the loss of bus 5A, the fuses for 31 CRDM fan blew.

LER 286-88-006 reported a similar occurrence.

Condensate Polisher Facility Bypass Valve Fails to Open

The CPF bypass valve did not open on the unit trip due to an open circuit in the control wiring.

LER 286-88-006 reported a similar occurrence.

CAUSE OF THE EVENT

The Authority has determined the following root causes from the investigation of the event.

Drop of the Twelve Control Rods

The normal bias supply card in Power Cabinet 1AC failed in August of this year. This card is not replaceable on line and was scheduled to be replaced at a subsequent outage. The backup bias power supply card receives power from MCC-39, which is in turn powered from 480V bus 5A. The deenergizing of bus 5A by the "Non-SI Blackout" logic resulted in a loss of the bias supply voltage to Rod Control Power Cabinet 1AC. When Power Cabinet 1AC lost its bias voltage, the twelve control rods associated with that cabinet, Shutdown Bank A Group 1, Control Bank A Group 1 and Control Bank C Group 1, dropped.

480 Volt Bus 5A Non-SI Blackout

Interviews with the I&C technicians involved in performing surveillance test 3PT-M62, "480 Volt Bus Undervoltage and Degraded Grid," divulged no inappropriate actions on their

part. A task analysis of 3PT-M62 failed to unearth any problems with the procedure, work environment, or human factors. Subsequent testing failed to locate a hardware problem as the root cause. Hence, the root cause is indeterminate. Because of separate and independent verification of the proper operability of the hardware, the plant staff has concluded that a personnel error occurred during the performance of surveillance test 3PT-M62, "480 Volt Undervoltage and Degraded Grid".

Station Auxiliary Transformer Tap Changer Sluggish Response

The cause of the sluggish response will be investigated during the Cycle 7/8 refueling outage.

Loss of Sequence of Events Record

An uninterruptible power supply energizes the plant computer. MCC-39, however, provides power to the sequence of events digital inputs (breaker and relay contacts). The feasibility of extending UPS power to this service will be investigated.

Leak on Pressurizer Safety Valve Loop Drain Valve

The cause of the packing leak on valve RCS-526 is not known.

Failure of 31 Control Rod Drive Mechanism Cooling Fan Line Fuses

31 CRDM Cooling Fan blowing its line fuses during restart is a repeat event (refer to LER 286-88-006) and will be investigated.

Condensate Polisher Facility bypass Valve Fails To Open

The CPF bypass valve did not open on the unit trip due to an open circuit in the control wiring.

CORRECTIVE ACTIONS

The following actions were undertaken as a result of this incident:

1) The plant staff will investigate the cause of the sluggish response of the Station Auxiliary Transformer Tap Changer during the Cycle 7/8 refueling outage.

2) The Technical Services Department will examine the feasibility of providing uninterruptible power to the plant computer's digital inputs.

3) The Maintenance Department repaired the packing leak on pressurizer safety valve loop drain valve RCS-526.

4) The Technical Services Department will evaluate the CRDM Fans in regard to their restart difficulty.

5) The Maintenance Department repaired the CPF bypass valve control circuit.

ANALYSIS OF THE EVENT

This event is reportable under 10CFR50.73(a)(2)(iv). The Authority has determined that this event has been considered under the guidelines of the plant FSAR and Technical specifications and no other safety concerns exist as a result of this event.

1) A reactor trip is part of the reactor design basis.

2) While the dropping of twelve control rods exceeds the reactivity worth of a control bank (nine rods) as analyzed in the FSAR, the operating crew responded swiftly to terminate the transient by manually tripping the reactor as is required by procedure. Due to their prompt response no thermal effects were seen.

In the event that no operator action had been taken:

a) Core power would have been limited by the dropped rod protection turbine runback to approximately seventy percent.

b) A reactor trip would occur due to low pressurizer pressure at 1900 psig due to the thermal shrink of the reactor coolant system volume.

3) The Non-SI Blackout actuation on bus 5A was equivalent to a loss of offsite power to the bus, an analyzed event in the FSAR and Technical Specifications.

4) Had the Station Auxiliary Transformer tap changer failed to maintain 480 volt bus voltage within the nominal range, the Non-SI Blackout logic would have actuated bus stripping, EDG start and tie-in, and starting of Non-SI Blackout loads. This would have been equivalent to a loss of offsite power, an analyzed event in the FSAR and Technical Specifications.

5) The valve RCS-526 leak was through a mechanical joint and less than 1 gpm. This is acceptable Reactor Coolant System leakage per Technical Specification 3.1.F.2 and 3.1.F.4.

6) FSAR or Technical Specifications do not address or establish requirements for the plant computer, Condensate Polisher Facility, and CRDM fans.

SECURING FROM THE EVENT

The Plant Operations Review Committee evaluated the safety implications of this event, and 100 hours of planned maintenance activities were completed before returning the unit to service.

On October 23, 1989, plant operators brought the reactor critical at 2137 hours. They synchronized the generator to the bus on October 24, 1989 at 0251 hours, and reached full power on October 25, 1989 at 0430 hours. The Authority has not reported any similar events or LERs to date.

Indian Point 3

Nuclear Power Plant
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914-736-8000

New York Power
Authority

November 21, 1989
IP3-89-082

Docket No. 50-286
License No. DPR-64

Document Control Desk
Mail Station PI-137
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

The attached Licensee Event Report LER 89-015-00 is hereby submitted in accordance with the requirements of 10CFR50.73. This event is of the type defined in the requirements per 10CFR50.73(a)(2)(iv).

Very truly yours,

Joseph Russell
Resident Manager
Indian Point Three Nuclear Power Plant

ED/rj
Attachment

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